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Load Frequency Control of Distributed Generation Systems using Ziegler-Nichols Method

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Abstract –**This paper deals with the load frequency control of Distributed Generation Systems (DGS) consisting of Wind, Solar and Diesel Generator. The Diesel Generator is controlled either by P or PI or PID controller to inject regulated amount of real power to the power system based on its rating. As a result it regulates the mismatch between the real power generation and the load which will lead to a minimum power and frequency deviations. A systematic way of deciding frequency bias parameter along with tuning the gains of the Proportional, Integral and Derivative controller (PID) based on Ziegler-Nichols method and ITSE performance criterion is proposed. The simulation studies are carried out for different types of controllers, and disturbances and it is found that it regulates the frequency with less number of oscillations, minimum peak over shoot, and settling time in the case of PID controller.**

Keywords –**Distributed Generation Systems (DGS), Proportional, Integral and Derivative Control (PID), Ziegler-Nichols method, Optimization methods, Tuning, Frequency Control, Diesel Generators, Wind and Solar, Simulation Analysis.**